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Remarks

The claims have been amended to direct the invention to the very much preferred lubricant bases and a wt. % range of organic compounds, which are much more easily mixed/blended with the lubricant base. Claims 1, 3, 4, 17 and 25 have been amended. Claims 2, 18-20, 23, 24, 26-28 and 31-32 have been canceled. Claims 36-43 are withdrawn per a restriction requirement. Claim 1, remains as the only independent claim in an attempt to simplify prosecution. All claims having already been considered, applicants submit there is no inclusion of either new matter, or new issues, or any requirements of additional searching, and request entry of the amendment.

Claim Rejections Under 35 U.S.C. 102 & 103
Based on Milliken et al. U.S. Patent 3,0876,213

Claims 1 and 8 stand rejected based on Milliken et al. under 35 U.S.C. 102 and claims 17-20, 24-28 and 32 stand rejected based on Milliken et al. under 35 U.S.C. 103.

Claim 2 has been inserted into amended claim 1 and organic compounds limited, so that claim 1 and claims dependent thereon should be allowable over Milliken et al.

In all cases, Milliken utilizes boron tri-fluoride-an inorganic fluorine-containing material in all the lubricants as set forth in col. 2 at ll. 26-44:

"The term "organic BF₃-carrier compound," as used herein, refers to organic compounds or complexes which will yield boron tri-fluoride in a reactive state at temperatures above 45° C, but below about 500° C. These carrier compounds are selected from the group consisting of R • HBF₄ and X • BF₃, where R represents a nitrogen-containing organic compound having a basic character such as an amine or amide, and where X represents

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an organic substance or carrier which will sorb or hold BF_3 , when treated therewith.

Generally, the $\text{R} \cdot \text{HBF}_4$ compounds may be described as being the products of reaction between the nitrogen-containing organic compound and hydrofluoroboric acid, HBF_4 . Those organic substances which contain sorbed or held BF_3 comprise a wide range of complexes, and in a few instances perhaps compounds, which may be prepared in various ways but which, for the most part, may be conveniently prepared by exposing the base material X to direct contact with gaseous BF_3 ..."

Milliken et al. teaches incorporating an inorganic fluoride into an organic lubricant base providing an organic-inorganic material. Milliken teaches the use of BF_3 using an organic carrier. Since BF_3 has a melting point of -127°C and a boiling point of -100°C, BF_3 must be complexed with a nitrogen containing compound to be stable in the casting lubricant. Milliken's Claim 1 states "... the method wherein the mold is lubricated with a composition containing an organic BF_3 -carrier compound selected from the group consisting of R-HBF_4 and X-BF_3 , where R represent a basic nitrogen-containing organic compound and X represents an organic substance which will sorb or hold BF_3 when treated therewith..."

Applicant's claims do not include this technology and none of the organic compounds has boron in the formula. In addition, all of the organic compounds are liquids or solids at room temperature. There is no equivalency here.

Claim 1 listing specific all organic fluorine containing compounds, within a wt % range should be allowable.

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Applicants respectfully submit that Milliken et al. does not teach or make obvious to one skilled in the art at the time the invention was made, the invention of amended Claims 1, 3, 4, 8, 17, and 25.

Claim Rejections Under 35 U.S.C. 102 & 103
Based on Newly Cited Abramowski et al. U.S. Patent 6,521,569.

Claims 1, 2 and 8 are rejected based on Abramowski et al. under 35 U.S.C. 102 and Claims 3, 4, 17-20, 23-28, 31 and 32 stand rejected based on Abramowski et al. under 35 U.S.C. 103.

Abramowski teaches a non-flammable liquid surface-penetrating lubricant consisting of tetrachloroethylene. While the claimed invention requires a lubricant base and selected organic compounds, it does not require the use of tetrachloroethylene. As stated in Column 4 lines 9-12 of the patent, "The oil and fluorocarbon polymer provide lubrication, and the non-VOC chlorinated solvent lowers the surface penetrant tension and provides the mixture desired non-flammable characteristics." The formulation applicant's claim can be flammable and would decompose during use in order to provide the needed benefit. Also, Abramowski et al. does not teach that his invention is useful for casting aluminum.

Applicants respectfully submit that Abramowski et al. does not teach or make obvious to one skilled in the art at the time the invention was made, the invention of amended Claims 1, 3, 4, 8, 17 and 25.

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Claim Rejections Under 35 U.S.C. 103
Based on Takagi et al. U.S. Patent 6,335,309

Claims 1-4 and 8 are rejected based on Takagi et al. under 35 U.S.C. 103.

Takagi et al. uses lubricants such as polytetrafluoroethylene, mica, graphite, soft metal.

Applicants require specific organic compounds in amended Claim 1 and require selected lubricant bases further containing specific organic compounds. Tagagi et al.'s invention teaches 1) powder solid lubricant; 2) adhesion enhancer; and 3) volatile solvent. Our invention does not require any of the three materials. In fact our invention would not work if the lubricant adheres to the mold. If the lubricant forms a solid film on the mold, the heat transfer from the molten aluminum to the chilled mold would be reduced so solidification could not occur. In addition, if a volatile solvent was added to our formulation, toxic fumes would be unacceptable during the casting of aluminum. The inventor's believe that Tagagi's formulation would not work for ingot casting aluminum. Applicants submit that Tagagi et al. would not make applicants invention of amended Claim 1 and claims dependent thereon; obvious to one skilled in the art at the time the invention was made.

Claim Rejections Under 35 U.S.C. 103
Based on Kok et al. U.S. Patent 6,040,278 Alone or in view of Abramowski et al.
U.S. Patent 6,521,569

Kok et al. teach the use of water-free compositions with wax material and silicone oil for shaping or reshaping, likely solid materials such as sheet. He does not teach use of the formulation for use with molten aluminum (at temperatures above 600°C.) In addition, water in the casting lubricant does not adversely affect the

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performance of the lubricant. The formulation of Claim 1, for use in manufacture of aluminum alloys, does not require a wax material nor silicone oil.

Applicants composition of Claim 1 as amended has important limitations that must be considered, as the court stated in In re Boe and Duke, 184 U.S.P.Q. 38, 40 (1974 C.C.P.A.):

"This court has stated that all limitation must be considered and that it is error to ignore specific limitations distinguishing over the references. In re Saether, 181 U.S.P.Q. 36, 39 (1974 C.C.P.A.); In re Glass, 176 U.S.P.Q. 489, 491 (1973 C.C.P.A.)."

Also, case law dictates that in proceeding from the prior art to the invention claims, one cannot base obviousness of what a person skilled in the art might try, but must consider what the prior art would have led a person to do, as stated in In re Tomlinson, Hall and Geigle, 150 U.S.P.Q. 623, 626 (C.C.P.A. 1966.) Applicants have amended Claim 1 to require a specific grouping of organic compounds which contain fluorine in a specific, narrow range, to provide oxidation inhibition useful in making aluminum alloys. A combination of Kok et al. and Ambramowski et al., if appropriate, could provide, for example, a non-flammable lubricant with surface penetrating characteristics containing oil and polybutene and a chlorinated solvent. Would one skilled in the art eliminate the 7% to 30% of at least one of polyethylene, polybutene, and polypropylene or ethylene-propylene copolymer, taught as essential and claimed by Kok et al.

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Applicants respectfully submit that Kok et al. taken either alone or in combination with Abramowski et al. would not make the invention of applicants amended Claim 1 or claims dependent thereon (3, 4, 8, 17 and 25) either anticipated by or obvious to one skilled in the art at the time the invention was made.

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Summary

All outstanding issues are believed to have been addressed. In view of the foregoing amendments and arguments, applicants respectfully request entry of the amendment, stressing that no new issues or new matter has been introduced and that issues have been clarified and simplified, and now submit that Claims 1, 3, 4, 8, 17 and 25 are in condition for allowance. Applicants respectfully request reconsideration and allowance of those claims. However, any suggestion by the Examiner as to deletion or modification of language to present allowable subject matter would be appreciated.

Respectfully submitted,



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